CLAIMS

WHAT IS CLAIMED IS:

1. A method for controlling a controlled parameter that affects a target parameter of a target zone, the method comprising:

providing a feedback control loop having a switching controller, a controlled device, and an averaging device, the controlled device having a time constant and a specified operational characteristic, the controlled device having a first operational state and a second operational state;

calculating a time constant for the averaging device based at least on the time constant for the controlled device, and the specified operational characteristic.

2. The method of Claim 1 wherein the specified operational characteristic comprises a minimum amount of time that the controlled device operates before it can be switched between the first operational state and the second operational state.

3. The method of Claim 2 wherein the first operational state comprises the controlled device in an on-condition and the second operational state comprises the controlled device in an off-condition.

4. The method of Claim 3 wherein the specified operational characteristic comprises a minimum amount of time that the controlled device operates before it can be switched between the first operational state and the second operational state.

5. The method of Claim 4 wherein the first operational state comprises the controlled device in an on-condition and the second operational state comprises the controlled device in an off-condition.

6. The method of Claim 1 wherein the controlled device comprises a plurality of discrete operating states.

7. The method of Claim 1 wherein calculating the time constant for the averaging device comprises calculating a total time constant and then subtracting the time constant for the controlled device.

8. The method of Claim 1 wherein the averaging device comprises a filter.

9. The method of Claim 8 wherein the filter is a first order filter.

10. The method of Claim 1 further comprising producing a pulsed output signal for turning the controlled device on and off, the output signal being based on the feedback signal and a desired level for the controlled parameter.

11. The method of Claim 10 wherein the system is an environmental management system and the controlled device is a compressor.

12. The method of Claim 11 wherein the controlled device is an environmental management system and the controlled parameter is a temperature of supply air coming off of a cooling element.

13. The method of Claim 1 wherein the target zone comprises one or more rooms in a building.

14. The method of Claim 1 wherein the feedback control system is an environmental management system, a controlled parameter is a temperature of air exiting a DX coil, and a target parameter is the temperature in the target zone.

15. The method of Claim 1 wherein the step of calculating the time constant for the averaging device is also based on a specified controllable range of the controlled device.

16. The method of Claim 15 wherein the controllable range is about 95 percent.

17. A system for controlling a controlled parameter that affects a target parameter of a target zone, the system comprising:

a feedback control loop having a switching controller, a controlled device, and an averaging device;

wherein the controlled device includes a time constant and a specified operational characteristic,

wherein the controlled device includes a first operational state and a second operational state;

wherein the averaging device includes a time constant based on the time constant for the controlled device, a controllable range of the controlled device, and the specified operational characteristic.

18. The system of Claim 17 wherein the specified operational characteristic comprises a minimum amount of time that the controlled device operates before it can be switched between the first operational state and the second operational state.

19. The system of Claim 18 wherein the first operational state comprises the controlled device in an on-condition and the second operational state comprises the controlled device in an off-condition.

20. The system of Claim 19 wherein the specified operational characteristic comprises a minimum amount of time that the controlled device operates before it can be switched between the first operational state and the second operational state.

21. The system of Claim 20 wherein the first operational state comprises the controlled device in an on-condition and the second operational state comprises the controlled device in an off-condition.

22. The system of Claim 17 wherein the averaging device comprises a filter.

23. The system of Claim 22 wherein the filter is a first order filter.

24. The system of Claim 17 wherein the controlled device is an environmental management system and the controlled device is a compressor.

25. The system of Claim 17 wherein the controlled device is an environmental management system and the controlled parameter is a temperature of supply air coming off of a cooling element.

26. The system of Claim 17 wherein the target zone comprises one or more rooms in a building.

27. The system of Claim 17 wherein the feedback control system is an environmental management system, a controlled parameter is a temperature of air exiting a DX coil, and a target parameter is the temperature in the target zone.

28. A system for controlling a controlled parameter that affects a target parameter of a target zone, the system comprising:

a feedback control loop including:

a switching controller;

a controlled device having a time constant, a specified operational characteristic, a controllable range of the controlled device a first operational state, and a second operational state; and

means for averaging a signal with a time constant based on the time constant for the controlled device, the controllable range of the controlled device, and the specified operational characteristic.

29. The system of Claim 28 wherein the means for averaging a signal comprises an averaging device.

30. The system of Claim 29 wherein the averaging device comprises a filter.

31. The system of Claim 30 wherein the filter comprises a first order filter.

32. A method for controlling a device having discrete operating states that affect a parameter of a target zone having a first time constant, the method comprising:

receiving a signal representative of a measured value of a controlled parameter of the device, the controlled parameter having a second time constant that is smaller than the first time constant;

passing the measured value through an averaging device using a third time constant to provide an averaged value;

producing a control signal representative of a deviation between the averaged value and a desired value of the controlled parameter;

converting the control signal into a pulsed output signal that turns the device on and off.

33. The method of Claim 32 wherein the device is a compressor of an air handling unit and the controlled parameter is a temperature of air coming off an expansion coil coupled to the compressor.

34. The method of Claim 32 wherein the averaging device is a filter.

35. The method of Claim 34 wherein the filter is a first order filter.

36. The method of Claim 32 wherein the third time constant is an approximation of the first time constant.

37. The method of Claim 32 wherein the control signal is an analog signal and converting the control signal includes applying a pulse width modulation control scheme.

38. The method of Claim 32 wherein the target zone comprises one or more rooms in a building.

39. The method of Claim 32 wherein the device is part of an environmental control system for a facility.